MINOR IN SCIENTIFIC AND ENGINEERING COMPUTING

The Scientific and Engineering Computing minor provides undergraduate students with computational and numerical skills and knowledge to augment their studies in their major programs. Core courses in mathematics and computing provide broad, general skills in numerical methods, algorithms, and scientific software development. Elective courses provide depth in applying numerical computation to problems in the field of the student's major.

Computational methods are now used routinely in virtually all fields of science and engineering, and are becoming more common in the social sciences. They have become essential to understand natural and humancreated phenomena and systems. Computation has been described as the third paradigm for scientific discovery and innovation, along with theory and experimentation. A minor curriculum in computation is a natural complement to major programs in science, engineering and the social sciences.

Minor Program of Study & Guidelines

Program of Study

A CS Minor application is required.

The Scientific and Engineering Computing minor must comprise at least 15 credit hours, of which at least 9 credit hours are upper-division coursework (numbered 3000 or above).

Code	Title	Credit Hours		
Prerequisites				
Math throu	gh Calculus III and Differential Equations			
CS 1331	Introduction to Object Oriented Programming ¹			
Required Cou	rses			
CX 4010	Computational Problem Solving for Scientists and Engineers ^{2,4}	3		
Numerical Me	thods			
Select one of	the following: ³	3		
AE 3090	Numerical Methods for Aerospace Engineering			
CHBE 2120) Numerical Methods in Chemical Engineering			
CX 4640	Numerical Analysis I			
MATH 464	0Numerical Analysis I			
ME 2016	Computer Applications			
MSE 3025	Statistics and Numerical Methods in Materials Science and Engineering			
Intro to Parallel Computing				
Select one of	the following:	3		
CX 4220	Introduction to High Performance Computing			
CX 4777	Introduction to Parallel and Vector Scientific Computing			
MATH 477	7Vector and Parallel Scientific Computation			
Electives				
Select two of	the following:	6		
AE 4040	Computational Fluid Dynamics			

Т	Total Credit Hours				
	PHYS 3266	Computational Physics			
	NRE 4234	Nuclear Criticality Safety Engineering			
	ME 4342	Computational Fluid Dynamics			
	MATH 4777	7Vector and Parallel Scientific Computation			
	MATH 464	I Numerical Analysis II			
	MATH 458	I Classical Mathematical Methods in Engineering			
	MATH 430	5Topics in Linear Algebra			
	MATH 426	1 Mathematical Statistics I			
	ECE 4823	Special Topics (Computational Methods in Electrical Engineering)			
	ECE 4783	Introduction to Medical Image Processing			
	ECE 4580	Computational Computer Vision			
	CX 4803	Special Topics in Computational Science and Engineering (Computational Sustainability)			
	CX 4777	Introduction to Parallel and Vector Scientific Computing			
	CX 4641	Numerical Analysis II			
	CX 4240	Introduction to Computing for Data Analysis			
	CX 4230	Computer Simulation			
	CX 4140	Computational Modeling Algorithms			
	CS 4710	Introduction to Computing Concepts for Bioinformatics			
	BMED 4783	Introduction to Medical Image Processing			
	AE 4132	Finite Element Analysis			

- ¹ CS 1331 is a pre-requisite for the minor and must be taken, but not included in the required 15 credit hours. A grade of A or B is required.
- ² Computer engineering students should take both CX 4220 and CX 4777/MATH 4777 rather than CX 4010.
- ³ If Numerical Methods is required by the student's Major, then the student may take an additional elective. Numerical Methods courses include (ECE and computer engineering students are restricted to taking AE 3090, CX 4640/MATH 4640, or MSE 3025)
 - No Special Problems or Internships coursework may be used towards the CS minor.
 - A grade of A or B is required for CS 1331. All courses used to satisfy the course requirements for a minor must be completed with a grade of C (2.00) or better.
 - All courses counting toward the minor must be taken on a lettergrade basis.
 - A maximum of 3 credit hours of transfer credit may be used to satisfy the course requirements for a minor. This includes courses taken at another institution or credit earned through the AP or IB program, assuming the scores meet Georgia Tech minimum standards.
 - It is the **major advisor's responsibility** to verify that students are using only courses from the designated block(s) from the student's major field of study that are allowed to satisfy a minor program, that they are not using any Core Area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Any free elective course used to satisfy the course requirements of the student's major degree program may also be used to satisfy the course requirements for a minor.